

BUL128D-B

HIGH VOLTAGE FAST-SWITCHING NPN POWER TRANSISTOR

- STMicroelectronics PREFERRED SALES TYPE
- n NPN TRANSISTOR
- n HIGH VOLTAGE CAPABILITY
- n LOW SPREAD OF DYNAMIC PARAMETERS
- MINIMUM LOT-TO-LOT SPREAD FOR RELIABLE OPERATION
- n VERY HIGH SWITCHING SPEED
- n INTEGRATED ANTIPARALLEL
- COLLECTOR- EMITTER DIODE

APPLICATIONS

- ELECTRONIC BALLAST FOR FLUORESCENT LIGHTING
- FLYBACK AND FORWARD SINGLE TRANSISTOR LOW POWER CONVERTERS

DESCRIPTION

The device is manufactured using high voltage Multi Epitaxial Planar technology for high switching speeds and medium voltage capability. It uses a Cellular Emitter structure with planar edge termination to enhance switching speeds while maintaining the wide RBSOA.

The device is designed for use in lighting applications and low cost switch-mode power supplies.

Table 1: Order Codes

Part Number	Marking	Package	Packaging	
BUL128D-B	BUL128D-B	TO-220	Tube	

Table 2: Absolute Maximum Ratings

Symbol	Parameter	Value	Unit
V _{CES}	Collector-Emitter Voltage (V _{BE} = 0)	700	V
V _{CEO}	Collector-Emitter Voltage (I _B = 0)	400	V
V_{EBO}	Emitter-Base Voltage	V _{(BR)EBO}	V
	$(I_{C}= 0, I_{B}= 2 \text{ A}, t_{p} < 10 \mu\text{s}, T_{J} = 150 ^{0}\text{C})$		
Ι _C	Collector Current	4	Α
I _{CM}	Collector Peak Current (t _p < 5ms)	8	А
Ι _Β	Base Current	2	А
I _{BM}	Base Peak Current (t _p < 5ms)	4	Α
ebruary 20	05	Rev. 2	1/

Figure 1: Package

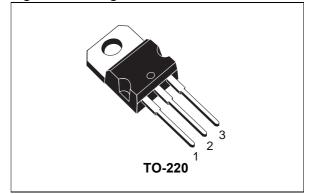
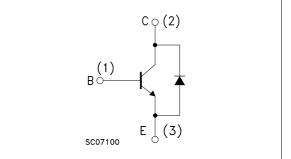


Figure 2: Internal Schematic Diagram



Symbol	Parameter	Value	Unit
P _{tot}	Total Dissipation at T _C = 25 °C	70	W
T _{stg}	Storage Temperature	-65 to 150	°C
Τ _J	Max. Operating Junction Temperature	150	°C

Table 3: Thermal Data

R _{thj-case}	Thermal Resistance Junction-Case	Max	1.78	°C/W
R _{thj-amb}	Thermal Resistance Junction-Ambient	Max	62.5	°C/W

Table 4: Electrical Characteristics (T_{case} = 25 ^oC unless otherwise specified)

Symbol Parameter		Test Conditions		Min.	Тур.	Max.	Unit
ICES	Collector Cut-off Current	V _{CE} = 700 V				100	μA
	(V _{BE} = 0 V)	V _{CE} =700 V	T _j = 125 ^o C			500	μA
I _{CEO}	Collector Cut-off Current	V _{CE} = 400 V				250	μA
	(I _B = 0)						
V _{(BR)EBO}	Emitter-Base Breakdown Voltage	I _E = 10 mA		9		18	V
	$(I_{\rm C}=0)$						
V _{CEO(sus)} *	Collector-Emitter Sustaining Voltage	I _C = 100 mA	L = 25 mH	400			V
	$(I_{B} = 0)$						
V _{CE(sat)} *	Collector-Emitter Saturation Voltage	I _C = 0.5 A	I _B = 0.1 A			0.7	V
		I _C = 1 A	I _B = 0.2 A			1	V
		I _C = 2.5 A	I _B = 0.5 A			1.5	V
		I _C = 4 A	I _B = 1 A		0.5		V
	Base-Emitter Saturation Voltage	I _C = 0.5 A	I _B = 0.1 A			1.1	V
		I _C = 1 A	I _B = 0.2 A			1.2	V
		I _C = 2.5 A	I _B = 0.5 A			1.3	V
h _{FE} *	DC Current Gain	I _C = 10 mA	V _{CE} = 5 V	10			
		I _C = 2 A	V _{CE} = 5 V	12		32	
	RESISTIVE LOAD	V _{CC} =200 V	I _C = 2 A				
t _s	Storage Time	I _{B1} = 0.4 A	V _{BE(off)} = -5 V		0.6		μs
t _f	Fall Time	R_{BB} = 0 Ω	L = 200 µH		0.1		μs
		(see figure 15)					
	INDUCTIVE LOAD	V _{CC} =250 V	I _C = 2 A				
t _s	Storage Time	I _{B1} = 0.4 A	I _{B2} = -0.4 A	2		2.9	μs
t _f	Fall Time	Tp = 30 µs	(see figure 14)		0.2		μs

* Pulsed: Pulsed duration = 300 μ s, duty cycle \leq 1.5 %.



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Figure 3: Safe Operating Area

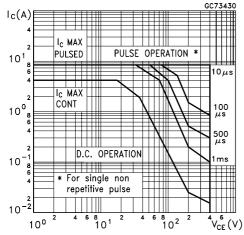
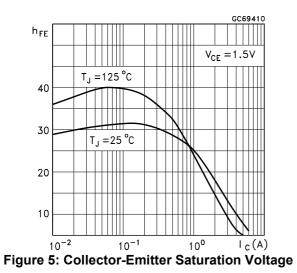


Figure 4: DC Current Gain



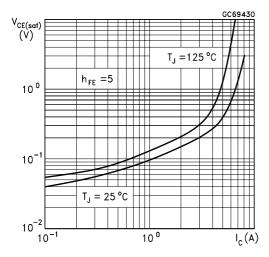


Figure 6: Derating Current

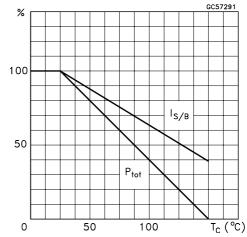
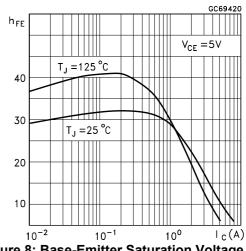
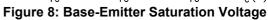
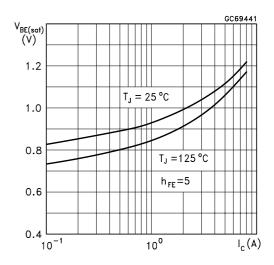


Figure 7: DC Current Gain







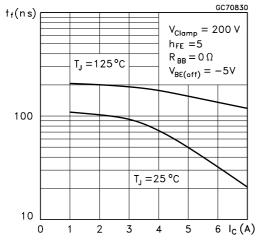


Figure 9: Inductive Load Fall Time



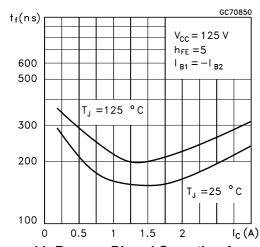


Figure 11: Reverse Biased Operating Area

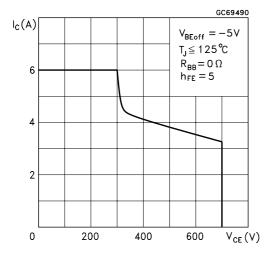


Figure 12: Inductive Load Stoarage Time

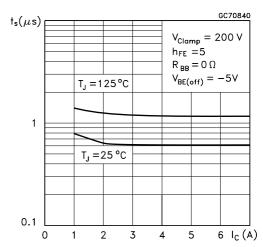


Figure 13: Resistive Load Stoarage Time

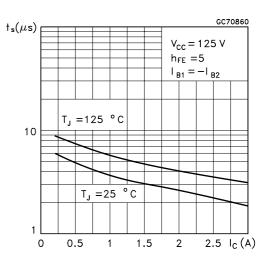


Figure 14: Inductive Load Switching Test Circuit

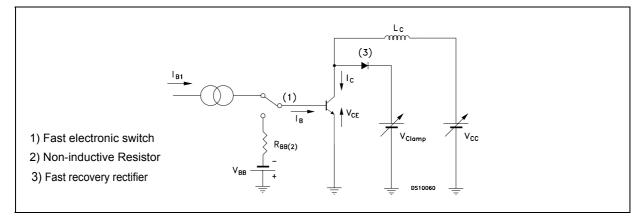
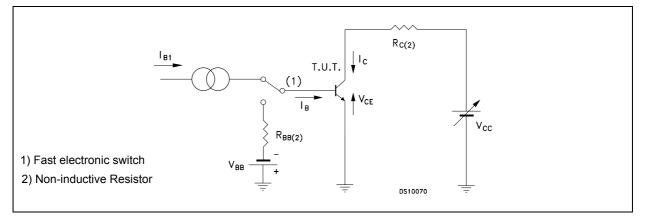


Table 15: Restistive Load Switching Test Circuit



DIM		mm.			inch		
DIM.	MIN.	ТҮР	MAX.	MIN.	TYP.	MAX.	
А	4.40		4.60	0.173		0.181	
b	0.61		0.88	0.024		0.034	
b1	1.15		1.70	0.045		0.066	
С	0.49		0.70	0.019		0.027	
D	15.25		15.75	0.60		0.620	
Е	10		10.40	0.393		0.409	
е	2.40		2.70	0.094		0.106	
e1	4.95		5.15	0.194		0.202	
F	1.23		1.32	0.048		0.052	
H1	6.20		6.60	0.244		0.256	
J1	2.40		2.72	0.094		0.107	
L	13		14	0.511		0.551	
L1	3.50		3.93	0.137		0.154	
L20		16.40			0.645		
L30		28.90			1.137		
øP	3.75		3.85	0.147		0.151	
Q	2.65		2.95	0.104		0.116	



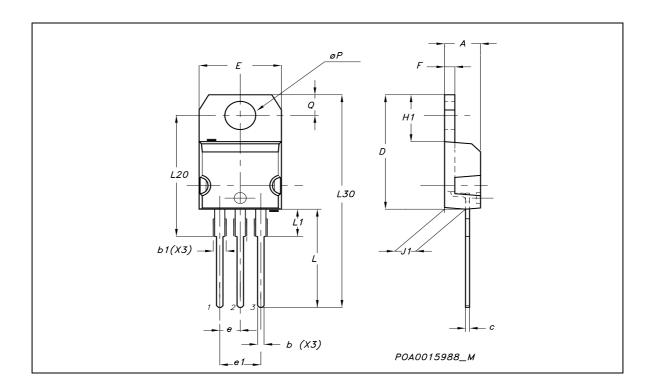


Table 5:

Version	Release Date	Change Designator
01-Oct-2002	1	First Release.
15-Feb-2005	1	Added table 1 on page 1.



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